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(71) Applicant

Patricia Heinlein
Industriestrasse 7, D-8800 Ansbach Eyb,
Federal Republic of Germany

(72) Inventor

Patricia Heinlein

(74) Agent and/or Address for Service

Jensen & Son
70 Paul Street, London, EC2A 4NA, United Kingdom

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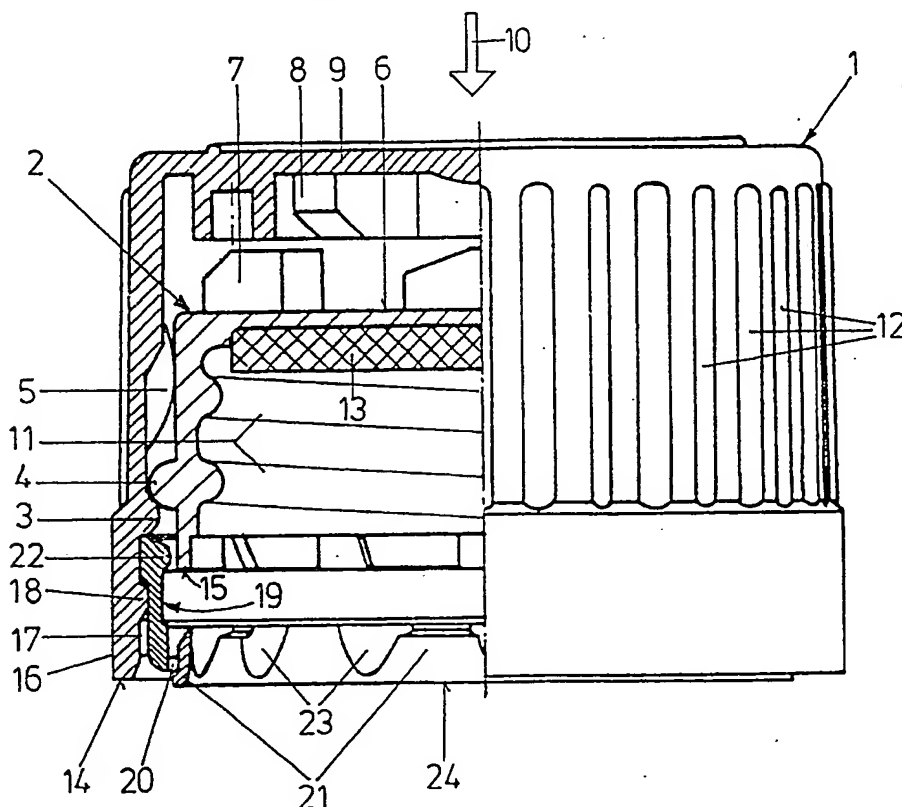
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(58) Field of search

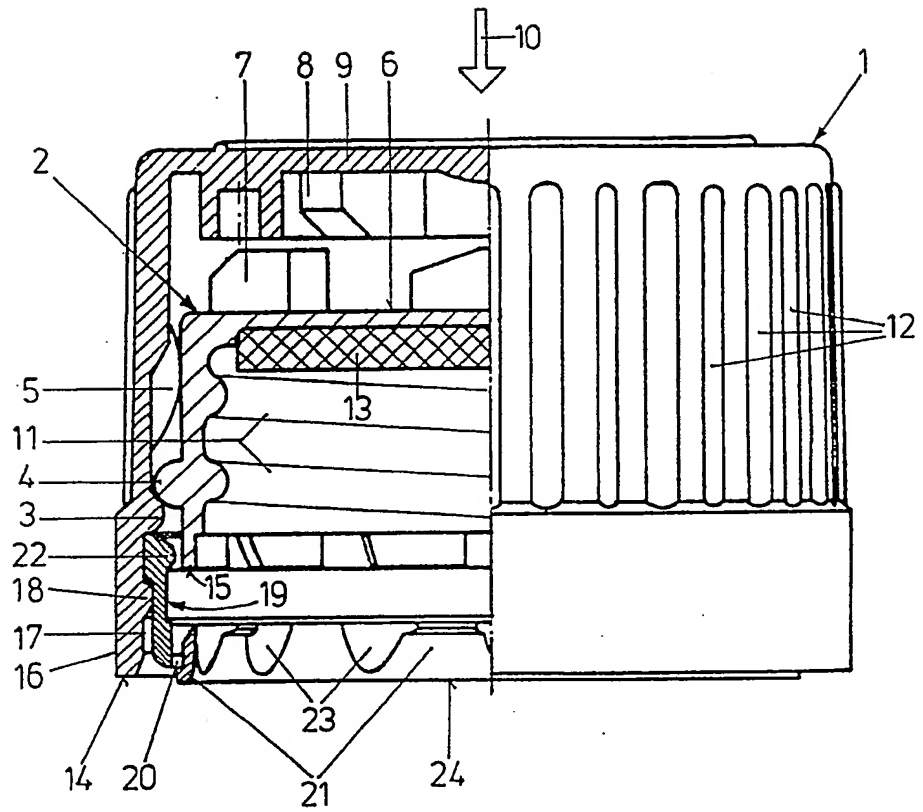
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(54) Childproof closure with tamper evident ring

(57) A childproof closure of plastic material for a bottle-type container and of the kind comprising an external cap (1) and an axially interlocking internal cap (2) includes a separately formed tamper evident ring (21) carried by the external cap. The external cap (1) extends beyond the lower rim (15) of the internal cap (2), a locking bead (18) being formed on the inside (17) of the projecting portion (16). An individually injection-molded combination of the tamperproof safety ring (21) and a retaining ring (19) connected with the latter by thin tear-off webs (20) is inserted into the projecting portion (16), a locking bead (22) of the retaining ring (19) gripping behind the locking bead (18) on the inside (17) of the projecting portion (16). The ring (21) may be tapered upwards and inwards and include recesses (23) which reduce the wall thickness to increase elasticity and ease initial assembly on the container.



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Childproof Closure

The invention relates to a childproof closure of plastic material for bottle-type containers comprising an external cap and an internal cap arranged within the latter, in the bottom portion of each of which caps resilient knobs facing each other being arranged which are movable into engagement and releasable by axial displacement of the external cap in relation to the internal cap, the internal cap being lockable into place behind an inside locking bead of the external cap by means of an outside locking bead.

A childproof closure of the generic type is known for instance from German patent 32 07 049. Childproof closures of this type, which have in principle proved successful in practice, make it desirable for some fields of application that there is the possibility to apply a tamperproof safety ring, which is retained on the neck of the bottle-type container by a so-called transfer ring when the closure cap is screwed off for the first time, so that thin connecting webs between the tamperproof safety ring and the associated retaining member break off, thus making obvious that a certain bottle had already been opened once.

To provide a tamperproof safety ring on a childproof closure of the type in question, the idea would suggest itself to use either the external cap or the internal cap as a retaining member for the tamperproof safety ring, i.e. to connect the tamperproof safety ring with one of the two caps by means of the thin webs.

However, to begin with, this is opposed by some aspects of injection-molding technique, since by construction the external cap and the internal cap must have locking beads projecting inwards or outwards, respectively, so as to ensure a locking engagement of the caps with each other. If, in addition, a tamperproof safety ring, which necessarily also projects inwards, were integrally formed on one of the two caps, there would be no way of practising a removal from the mold. This applies in particular when the tamperproof safety ring is arranged on the internal

cap which has a bead that projects outwards, whereas the tamperproof safety ring must project inwards.

However, arranging the tamperproof safety ring on the external cap, which is conceivable, will, besides problems of removal technique, give rise to the risk of the tamperproof safety ring being damaged during cutting operations after molding.

A further essential problem of providing a childproof closure with a tamperproof safety ring results from that, by reason of the childproof mechanism, a higher screwing pressure must be applied when the closure is screwed on for the first time after the bottle has been filled by the manufacturer, which may result in the tamperproof safety ring breaking off the retaining webs when the closure is screwed on for the time, giving the first user of such a product the incorrect impression that the bottle he has opened is not in its original condition, i.e. has not been opened for the first time.

Commercially available solutions of childproof closures provided with tamperproof safety rings that are available on the market are unsatisfactory, there being neither sufficient functionality of the childproof mechanism nor sufficient tamperproof security, and/or the known solutions allowing for little attractiveness of design with the closure cap bulging outwards and extending in steps.

It is accordingly the object of the invention to embody a childproof closure of the type mentioned at the outset such that, efficient manufacture ensured, a closure of high functional reliability from childproof as well as from tamperproof aspects can be realized to be attractive in design.

According to the invention this object is attained in that the external cap extends beyond the lower rim of the internal cap, in that a locking bead is formed on the inside of the projecting portion thus formed of the external cap, in that an individually injection-molded combination of a

tamperproof safety ring and a retaining ring connected with the latter by thin tear-off webs is inserted into the projecting portion, a locking bead of the retaining ring gripping behind the locking bead on the inside of the projecting portion.

It may be known per se to form the tamperproof safety ring together with a retaining ring as an individual part, as described for instance in German patent 25 18 117 for a closure cap without a childproof mechanism. However, the nub of the invention consists in using and arresting this combination of a retaining ring and a tamperproof safety ring in a most advantageous way in a graduation formed by the different axial lengths of the internal cap and the external cap. This graduation ensures in particular to manufacture a childproof closure with and without a tamperproof safety ring by one and the same tool, since in either case only the locking bead on the inside of the external cap must be provided. If no retaining ring with a tamperproof safety ring is locked into place, this bead does not affect the functioning. Consequently, a high degree of efficiency of the manufacturing process is achieved.

The functioning of the childproof mechanism remains totally independent of the arrangement of the tamperproof safety ring, there being, on the other hand, the possibility of arranging the tamperproof safety ring on the bottle neck regardless of the fact that a higher screwing pressure is necessary.

Ultimately, there is also the possibility of a very attractive design being realized due to the embodiment according to the invention.

According to a further feature of the invention it is provided for the external cap to have a surface that extends substantially cylindrically without any graduation or slightly conically as far as its lower rim.

In keeping with a further object of the invention it is provided that the tamperproof safety ring extends in a manner tapering conically from the retaining ring inwards and upwards. This ensures that during the first

assembly the tamperproof ring can be elastically slipped over the transfer ring of the bottle without retaining webs breaking off, while it is ensured that the tamperproof safety ring reliably interlocks when the closure cap is screwed off to open the bottle and, consequently, that the retaining webs break off and the safety ring remains on the bottle neck.

To obtain an elastically locking engagement of the otherwise rigid tamperproof safety ring it may be advantageous that several recesses arranged parallel to each other on the inside of the tamperproof safety ring are formed such that the recesses reduce the wall thickness of the tamperproof safety ring, each of these recesses widening from the lower rim of the tamperproof safety ring upwards seen in the circumferential direction.

Further details of the invention will become apparent from the ensuing description of a preferred embodiment taken in conjunction with the drawing.

One half of the drawing is a section through, the other half is a view of a childproof closure according to the invention.

A childproof closure illustrated in the drawing comprises an external cap 1 and an internal cap 2. On the inside of the external cap 1 a locking bead 3 is formed to project inwards, while a locking bead 4 projecting outwards is formed on the outside of the internal cap 2, so that, being axially undetachable to the outside, the internal cap 2 is axially displaceably lockable inside the external cap 1.

Guide projections 5 on the inside of the external cap 1 provide for defined axial movement of the internal cap 2.

On the top side of the bottom 6 of the internal cap 2 knobs 7 are arranged which cooperate with knobs 8 on the bottom side of the bottom 9 of the external cap 1. As specified in detail in German patent 32 07 049, it is thus possible, by axial pressure exercised in the direction of the

arrow 10 on the external cap, to move the latter into rotational engagement with the internal cap 2, so that the internal cap can be screwed off the bottle neck via the thread 11. If no axial pressure is exercised on the external cap 1 in the direction of the arrow 10, then the external cap 1 will freely rotate in relation to the internal cap 2, i.e. there is no possibility of unscrewing the internal cap and thus the entire closure.

To facilitate the unscrewing process the external cap 1 has a plurality of gripping ribs 12 extending in parallel and provided in the upper part of its cylindrical surface. In a manner equally known per se, a seal washer 13 is arranged on the inside of the cover 6 of the internal cap 2.

The lower rim 14 of the external cap is located underneath the lower rim 15 of the internal cap 2, a projecting portion 16 of the external cap 1 thus being produced.

A locking bead 18 is formed on the inside wall 17 of this portion 16.

By way of a plurality of thin webs 20 a retaining ring 19 is manufactured to form one molded piece of plastic material with a tamperproof safety ring 21.

The retaining ring has a section 22 extending further radially outwards and dimensioned such that the retaining ring 19 can be locked into place behind the locking bead 18 of the portion 16 while being defined axially upwards by the locking bead 3 there provided, so that there is no need of a special axial abutment.

Along its circumference the tamperproof safety ring 21 has a plurality of parallel recesses 23 which expand from the lower rim 24 of the tamperproof safety ring 21 upwards in the circumferential direction. The structure of these recesses 23 is such that they are not formed as complete breakthroughs, but that in their vicinity the wall thickness of the tamperproof safety ring 21 is reduced only to increase the elasticity during the locking operation. The conical shaping of the tamperproof safety

ring, namely such that it tapers slightly conically from its lower rim 24 upwards and inwards, equally only serves to facilitate the locking operation.

This embodiment makes it possible for the entire closure arrangement to be screwed on with the aid of usual screwing automats after the bottles have been filled, it being ensured that the retaining webs 20 do not inadvertently break off, because the tamperproof safety ring can slide comparatively easily over the transfer ring on the bottle. On the other hand, due to the locking bead 18 the locking engagement is sufficient for the retaining ring 19 of the tamperproof safety ring 21 to be connected so tightly with the external cap 1 during the unscrewing operation that the retaining webs 20 break off, so that the tamperproof safety ring 21 remains on the bottle and the retaining ring 19 remains on the inside of the external cap 1.

Claims

1. A childproof closure of plastic material for bottle-type containers comprising an external cap and an internal cap arranged within the latter, in the bottom portion of each of which caps resilient knobs facing each other being arranged which are movable into engagement and releasable by axial displacement of the external cap in relation to the internal cap, the internal cap being lockable into place behind an inside locking bead of the external cap by means of an outside locking bead, characterized in that the external cap extends beyond the lower rim of the internal cap, in that a locking bead is formed on the inside of the projecting portion thus formed of the external cap, and in that an individually injection-molded combination of a tamperproof safety ring and a retaining ring connected with the latter by thin tear-off webs is inserted into the projecting portion, a locking bead of the retaining ring gripping behind the locking bead on the inside of the projecting portion.
2. A childproof closure according to claim 1, characterized in that the external cap has a surface that extends substantially cylindrically without any graduation or slightly conically as far as its lower rim.
3. A childproof closure according to claim 1, characterized in that the tamperproof safety ring extends in a manner tapering conically from the retaining ring inwards and upwards.
4. A childproof closure according to claim 1, characterized in that several recesses arranged parallel to each other on the inside of the tamperproof safety ring are formed such that the recesses reduce the wall thickness of the tamperproof safety ring, each of these recesses widening from the lower rim of the tamperproof safety ring upwards seen in the circumferential direction.
5. A childproof closure of plastic material for bottle-type containers, substantially as described herein with reference to, and as illustrated in, the accompanying drawing.

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Patents Act 1977
E miner's report to the Comptroller under
Section 17 (The Search Report)

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Relevant Technical fields

(i) UK Cl (Edition L) B8T (THSA, TTC)

(ii) Int Cl (Edition 5) B65D 55/02 55/08

Search Examiner

LINDA HARDEN

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

8 MARCH 1993

Documents considered relevant following a search in respect of claims 1-5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 2187177 A (BORMIOLI METALPLAST) see Figure 1	1,2
Y	GB 2122979 A (STERICRIC SA) see Figure 2	1,2
Y	DE 2518117 A1 (H HEINLEIN) see Figure 1	1,2

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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